

27 Aug 01

DEPARTMENT OF THE AIR FORCE
Aerospace Basic Course (AETC)
Maxwell Air Force Base, Alabama 36112

LESSON PLAN

A1220, AIR AND SPACE POWER FUNCTIONS

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Educational Goals	A1220-G-1 thru G-2
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RECORD OF CHANGES

CHANGE NUMBER	REMARKS
New Lesson Plan	Supersedes ABC lesson 1115 dated 7 Aug 00

SUMMARY OF CHANGES

EDUCATIONAL GOALS

A1000 Area Objective: Apply aerospace power capabilities and officership principles to warfighting.

A1200 Phase Objective: Comprehend how the proper employment of aerospace systems enhances warfighting.

A1220 - AIR AND SPACE POWER FUNCTIONS

Lesson Objective 1: Know the air and space power functions.

Samples of Behavior:

1.1 - List the air and space power functions and their offensive & defensive elements (if any).

1.2 - Describe the air and space power functions and their offensive & defensive elements (if any).

1.3 - Give examples of air and space systems that could be used to perform air and space power functions.

Lesson Objective 2: Comprehend the air and space power functions.

Samples of Behavior:

2.1 - Differentiate between air and space power functions.

2.2 - Differentiate between offensive & defensive elements (if any) of the air and space power functions.

2.3 - Explain which air and space power functions (or their elements) are demonstrated in aerospace power employment scenarios.

Lesson Description: This lesson introduces students to the broad, fundamental, and continuing activities of air and space power that comprise the Air Force's basic functions, according to AFDD 1. Students will also discuss the various air and space systems that the US can employ to perform these functions.

Prerequisites: A1210, Air and Space Systems and Capabilities

Preparation: Read A1220, Air and Space Power Functions.

Read AFDD 1, pp. 29, 45-60.

Review A1210, Air and Space Systems and Capabilities.

Optional: N/A

Rationale/Linkage: The A1200 Phase of instruction focus on proper employment of aerospace systems to achieve desired effects. In A1210, Air and Space Systems and Capabilities, students learn not only about individual systems' capabilities, but also about their limitations. In this lesson, students learn about the broad, fundamental, and continuing activities of air and space power that comprise the Air Force's basic functions, according to AFDD 1. Lesson A1230, Force Packaging, integrates the information of A1210 and A1220: In A1230, students learn that we can best accomplish the functions of air and space power when different air and space systems work together, thereby achieving synergy. Students learn how we assemble force packages to maximize the benefit gained by each system's capabilities and minimize the liabilities of each system's limitations. These lessons prepare students for A1250, Air Force Employment Exercise (AFEX), as well as for the A1300 Phase of instruction on the Air Force Core Competencies, and the A1700 Phase--Blue Thunder.

INSTRUCTIONAL PLAN

1. **TITLE AND LENGTH OF SEMINAR:** Air and Space Power Functions (1:30)
2. **RELATION TO OTHER INSTRUCTION:** The A1200 Phase of instruction focus on proper employment of aerospace systems to achieve desired effects. In A1210, Air and Space Systems and Capabilities, students learn not only about individual systems' capabilities, but also about their limitations. In this lesson, students learn about the broad, fundamental, and continuing activities of air and space power that comprise the Air Force's basic functions, according to AFDD 1. Lesson A1230, Force Packaging, integrates the information contained in A1210 and A1220. In A1230, students learn that we can best accomplish the functions of air and space power when different air and space systems work together, thereby achieving synergy. Students learn how we assemble force packages to maximize the benefit gained by each system's capabilities and minimize the liabilities of each system's limitations. These lessons prepare students for A1250, Air Force Employment Exercise (AFEX), as well as for the A1300 Phase of instruction on the Air Force Core Competencies, and the A1700 Phase--Blue Thunder.
3. **GENERAL METHOD OF INSTRUCTION:**

a. **Presentation Method:** Informal lecture

b. **Time Outline:**

Segment Time	Total Time	Description
0:05	(0:05)	Introduction
0:40	(0:45)	MP I: Counterair, Counterspace, Counterland, Strategic Attack, and Countersea
0:20	(1:05)	MP II: Counterinformation, Command and Control, Airlift, Air Refueling, Spacelift
0:20	(1:25)	MP III: Special Operations Employment, Reconnaissance, Surveillance, Intelligence, Combat Search and Rescue, Navigation and Positioning, and Weather Services
0:05	(1:30)	Conclusion

c. Instructor Preparation:

- Review the lesson plan.
- Read A1220, Air and Space Power Functions.
- Read AFDD 1, pp. 29, 45-60.
- Review A1210, Air and Space Systems and Capabilities.

d. Instructional Aids/Handouts:

- Slides

e. Student Preparation:

- Read A1220, Air and Space Power Functions.
- Read AFDD 1, pp. 29, 45-60.
- Review A1210, Air and Space Systems and Capabilities.

f. Strategy: This lesson is an informal lecture. Much of it comes straight from AFDD 1's coverage of the 17 functions of air and space power. Remind students to feel free to ask questions throughout the presentation, but don't forget that there is a great deal of important information to cover. So, keep any emerging class discussions on-track. The extensive slide presentation should help a great deal. To keep students engaged, the informal lecture on each function of air and space power concludes with a brief guided discussion of the air and space systems that we could potentially use to perform that function. The list of Anticipated Responses often includes not only primary systems for performing the function, but also support systems. However, not all of the lists are broken down into these categories. Encourage the students to consider all of the possibilities for performing these air and space functions. This will prepare them for Lesson A1230, Force Packaging.

g. References: N/A

4. DETAILS OF INSTRUCTION

a. Introduction: 0:05 (0:05)

1) //Attention//

[SLIDE]



Which satellite is your favorite satellite? Or, which aircraft is your favorite? Which do you think is the “best” one the Air Force owns? Well, why do you think we have so many different air and space systems in the inventory? We’ll explore one compelling reason throughout this lesson:

2) //Motivation//

[SLIDE]



The Department of Defense purchases systems designed to perform at least one of the functions of air and space power that we’re about to discuss. Of course, there’s some overlap: Several air and space systems perform similar functions. As Airmen, it’s important for you to understand each of the 17 air and space power functions outlined in AFDD 1--seen here on this slide--because they’re the “broad, fundamental, and continuing activities of air and space power” through which Air Force units accomplish their assigned missions.

3) //Overview//

[SLIDE]



We'll discuss the functions of air and space power covered in AFDD 1, and illustrate several with examples. Since AFDD 1 doesn't list specific systems we can use to perform these functions, we'll talk about some of the systems that we could potentially use, based on what you learned in Lesson A1210, Air and Space Systems and Capabilities.

Although we often associate a particular platform with a particular function, most air and space systems can perform several functions to achieve strategic, operational, or tactical objectives. Simply keep this in mind: the **desired effects** dictate which weapon system we use, not the other way around!

(TRANSITION): LET'S BEGIN WITH THE AIR AND SPACE POWER FUNCTIONS THAT "COUNTER" THE ENEMY'S AIR, SPACE, LAND, AND SEA FORCES.

b. MP I: Counterair, Counterspace, Counterland, Strategic Attack, and Countersea: 0:40 (0:45)

{Instructor Note: In the slide show, the section for each function begins with a copy of the slide showing AFDD 1 surrounded by the 17 functions, with the upcoming function highlighted--labeled "Introductory Slide" below. In the interest of space, the other 16 Introductory Slides don't appear in the lesson plan. However, each is represented by the term "Introductory Slide," with a transition appearing on the same line, as below:}

[INTRODUCTORY SLIDE] First, let's talk about Counterair.



[SLIDE]



AFDD 1 defines counterair as attaining or maintaining a desired degree of air superiority by destroying or neutralizing enemy forces.

Counterair has two elements:

- Offensive counterair, called “OCA”
- Defensive counterair, called “DCA”

[BUILD] Offensive counterair includes operations to destroy, neutralize, disrupt or limit enemy air defenses.

[BUILD] Defensive counterair includes operations to defeat enemy’s offensive plan through air and/or missile attack.

[SLIDE]



OCA missions may include attacks against enemy integrated air defenses (IADs), command & control centers, surface-to-air missiles (SAMs), and airfields. The

key is attacking at a time and place of our choice; retaining the initiative. As such, OCA provides us with the most effective and efficient method for achieving air superiority.

This slide demonstrates the “**surface strike or attack**” type of OCA missions. Surface strikes are intended to disrupt or destroy select targets on the ground. These missions are directed against enemy air and missile threats and their support infrastructure (such as airfields, runways, and even aircraft themselves) with the goal of preventing the enemy from getting airborne. In this case, the target is the runway:

[BUILD]

Let’s take a quick look at some other types of OCA missions.

[SLIDE]



Sweeps are offensive patrols inside enemy airspace to encounter enemy aircraft and engage them, as seen here:

[BUILD]

For maximum flexibility, sweep missions operate independently and are not attached to any other missions.

[SLIDE]

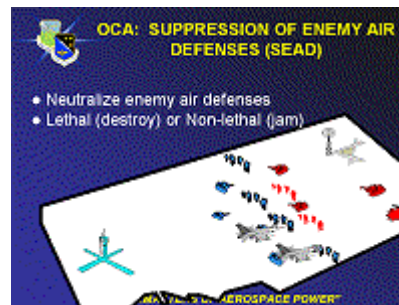


The same kind of “air superiority” fighter aircraft that can perform sweeps often perform **escort** missions, too. Escort missions differ from sweeps in one basic way: Escorts generally stay near the aircraft they’re accompanying, to protect them from enemy aircraft, whereas sweeps operate independently, as you just heard. Remember, both escort missions and sweeps generally occur inside enemy airspace. In the case illustrated in this slide, F-15Cs escort bomb-laden F-16s.

[BUILD]

Don’t forget that the roles could easily be reversed, in a different scenario: F-16s configured for air-to-air combat could escort bomb-laden F-15Es, for instance.

[SLIDE]



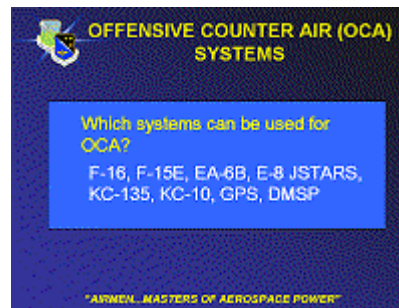
To further protect friendly forces, we also need to neutralize enemy air defenses such as surface-to-air missiles (or “SAMs”) and anti-aircraft artillery (or, “triple-A”), along with their supporting command and control structure. This is called suppression of enemy air defenses, or “**SEAD**.”

Two aircraft that specialize in this mission are the F-16CJ and EA-6B, which often work as a team. Depending on our desired effects, targets may be neutralized using either lethal or non-lethal methods: Targets may be lethally destroyed using various munitions, including the AGM-88 High-speed Anti-Radiation Missile, or “HARM,” which homes in on enemy ground radar emissions. Otherwise, targets may be non-lethally jammed using electronic methods. In this example, F-16s destroy the mobile SAM launcher on the far right--an example of a lethal method:

[BUILD]

If an EA-6B Prowler jammed the site instead, that would have been an example of a non-lethal method of SEAD.

[SLIDE]



LEAD OFF QUESTION (LOQ): WHICH SYSTEMS CAN BE USED FOR OFFENSIVE COUNTERAIR?

{Instructor Note: The following list--and all others in this lesson--includes not only primary systems, but also support systems, but not all lists of Anticipated Responses are broken down into these categories. Encourage the students to consider all of the possibilities for performing these air and space functions.}

ANTICIPATED RESPONSES (AR):

- **[BUILD]** F-16, F-15E, EA-6B, etc. as mentioned above
- Support systems: E-8 JSTARS to locate ground targets, E-3 AWACS to locate airborne threats, KC-135 & KC-10 for extending range of strike aircraft, GPS for accurate weapons delivery and aircraft navigation, etc.

{Instructor Note: For further reference, here are the definitions of OCA missions, according to AFDD 2-1.1, Counterair Operations:

- **Surface Attack:** *Surface strike/attack missions are intended to disrupt or destroy select targets on the ground. These missions are directed against enemy air and missile threats and their support infrastructure (e.g., airfields, launch sites, launchers, runways) before launch. The main goal is to prevent enemy air and missile assets from being employed. When unable to prevent missile launches, attack assets can be immediately directed to locate and destroy launchers before they can reload or relocate.*
- **Fighter Sweep:** *The fighter sweep is an offensive mission conducted by fighter aircraft to seek out and destroy enemy airborne targets of opportunity in an allotted area of operations.*

- ***Escort:*** *Escort missions are protection sorties flown over enemy territory against enemy aircraft and air defense systems. Friendly aircraft, en route to or from a target area, may be assigned escort aircraft to protect them from enemy air-to-air and surface- to- air threats. Escort aircraft may be tasked to protect such missions as interdiction, reconnaissance airlift, search and rescue, aerial refueling, airborne C2 and electronic warfare.*
- ***Suppression of Enemy Air Defenses (SEAD):*** *SEAD is a primary OCA mission designed to neutralize, destroy, or temporarily degrade enemy surface-based air defenses by destructive or disruptive means. SEAD requirements may vary according to mission objectives, system capabilities, and threat complexity. SEAD objectives are specified by the Joint Force Commander (JFC), who considers the unique capabilities of each component to contribute to counterair operations.}*

[SLIDE]



Defensive counter air (DCA) concentrates on defeating the enemy's offensive plan by inflicting losses on attacking enemy forces at levels unacceptable to the enemy.

DCA is synonymous with “air defense,” and normally takes place over (or close to) friendly territory. It involves all aspects of air defense, including detection, identification, interception, and destruction of attacking enemy aircraft and missiles.

[SLIDE]



Combat Air Patrol, or “CAP,” is a DCA mission used to minimize the enemy air threat where friendly forces are located. Aircraft flying CAP are usually assigned to a particular orbit, target, or zone. Some examples you might see are:

- High Value Airborne Asset (HVAA) CAP, for protecting AWACS, JSTARS, ABCCC, U-2, or other high value “targets” (which in this case, are our assets)
- Area Air Defense, which is used to establish a protective zone covering other resources are in the area
- Point Defense, which is for defending the skies over a specific point, such as a friendly base

Aircraft performing CAP missions must have superior air-to-air capabilities.

[SLIDE]



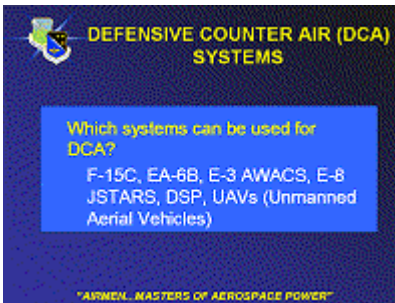
Air defense alert is similar to CAP, with the exception that the aircraft are not on a flying patrol, but are on the ground in an alert posture.

Alert postures may range from:

- Engines running, to
- aircrews in the aircraft but engines not started, to
- aircrews near the aircraft and ready to start engines and launch the aircraft

Alert has the advantage of minimizing the amount of fuel you burn, but has the disadvantage of possibly delaying our reaction to ingressing enemy threats.

[SLIDE]



FUQ: WHICH SYSTEMS CAN BE USED FOR DEFENSIVE COUNTERAIR?

AR:

- [BUILD] F-16, F-15E, EA-6B, etc., as mentioned above
- Support systems: E-8 JSTARS and UAVs (unmanned aerial vehicles) to locate ground targets, E-3 AWACS to locate airborne threats, KC-135 & KC-10 for extending range of strike aircraft, GPS for accurate weapons delivery and aircraft navigation, DSP to detect enemy missile launches, etc.

[INTRODUCTORY SLIDE] Since space is an indispensable part of our operations today, let's look at the function of counterspace next.

[SLIDE]



Counterspace involves attaining and maintaining a desired degree of space superiority by destroying or neutralizing enemy space systems. The objective is to allow friendly forces to exploit space capabilities, while denying the enemy the ability to do the same.

Like counterair, counterspace consists of offensive and defensive elements:

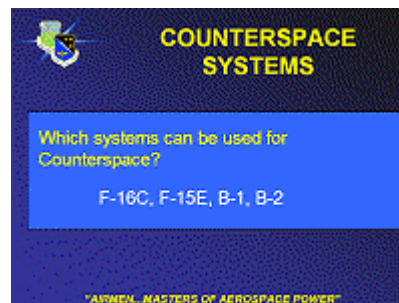
Offensive counterspace (OCS) is designed to destroy or neutralize an adversary's space systems. OCS is conducted to achieve one of five major goals: **deception, disruption, denial, degradation, or destruction** of space assets or capabilities.

It's vital to retain the initiative and attack at a time and place of our choosing. Even so, current treaties limit the type of offensive actions we can take against satellites in orbit. However, we can target ground stations that control satellites and jam the communication links between the satellite and the ground station.

Defensive counterspace (DCS) consists of active or passive actions to protect our space-related forces:

- **Active DCS** is the detection, identification, interception, and destruction or neutralization of enemy space and missile forces. According to AFDD 2-2 (and the Student Reader), active defense operations include maneuvering our spacecraft, deploying mobile ground links and terrestrial-based elements, and deploying decoys. It may also include the employment of lethal protection methods.
- **Passive DCS**, on the other hand, is reducing our vulnerabilities and increasing the survivability of friendly space forces and the information they provide. Passive defense includes measures such as encryption, frequency hopping, and hardening. ("Frequency hopping" is a technique for protecting transmissions: The transmitter changes frequency several times throughout the transmission to defeat enemy attempts to jam the signal.) Space systems are also defended by camouflage, concealment, deception, redundancy, mobility, and dispersion.

[SLIDE]



FUQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM COUNTERSPACE?

AR:

- **[BUILD]** F-16, F-15E, B-1, B-2 to attack ground satellite stations (This list is not exhaustive--many other systems can perform these missions.)

[INTRODUCTORY SLIDE] Now that we've looked at counterair and counterspace operations, let's put our feet on the ground and discuss counterland.

[SLIDE]



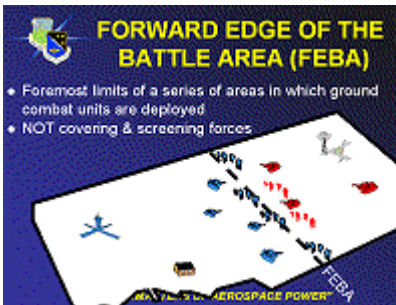
Counterland involves gaining and maintaining a desired degree of superiority over surface operations by the destruction or neutralization of enemy forces. AFDD 1 explains that although normally associated with support to friendly surface forces, “counterland” is a flexible term that can encompass the identical missions without the presence of friendly surface forces. For instance, we’ll see in Lesson A3060 that this was the case during Operation ALLIED FORCE, when the Air Force was tasked to destroy Serbian ground forces without the support of friendly ground forces. But for the sake of clarity in this lesson, we’ll talk about counterland in relation to friendly ground forces.

Counterland has offensive and defensive elements, so to speak, but they are never labeled as such. Traditionally, “offensive counterland” missions are called interdiction, and “defensive counterland” missions are close air support (CAS).

The best way to explain interdiction and CAS is to define where each occurs on the battlefield. To do that, let’s define a few terms associated with ground operations. This is just for reference: You won’t be tested on these next three terms.

{Instructor Note: The FEBA, FLOT, & FSCL slides contain animation that occurs automatically after each slide appears: There are no “builds” requiring you to hit the “next slide” button--the animation just appears soon after the slide does.}

[SLIDE]



The “forward edge of the battle area,” or “FEBA,” is the foremost limit of a series of areas in which friendly ground combat units are deployed--**excluding** the areas in which only covering or screening ground forces are operating.

[SLIDE]



The “forward line of own troops,” or “FLOT,” indicates the most forward positions of **any kind** of friendly forces--**including** covering and screening ground forces.

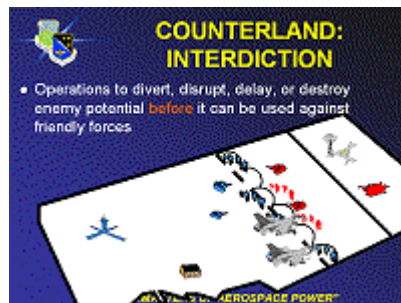
[SLIDE]



The “fire support coordination line,” or “FSCL,” is an arbitrary line placed **beyond** the FEBA and FLOT. In other words, the land component commander of a Joint force decides where to place the FSCL. Then, **All** weapons fire from the ground, sea, or air must be coordinated through the land component commander, to protect the integrity of the Joint operation and to prevent fratricide. This way, ground forces know they can push forward to the FSCL on the spur of the moment, without fear of coming under friendly fire.

With the terms FEBA, FLOT, and FSCL in mind, let's look at interdiction.

[SLIDE]



Interdiction involves operations to divert, disrupt, delay, or destroy the enemy's surface military potential before it can be used effectively against friendly forces. So, interdiction is, by nature, offensive--and interdiction occurs beyond the FSCL. AFDD 1 says the air component commander of a Joint force is responsible for planning and executing the theater-wide interdiction effort. Since interdiction occurs beyond the FSCL, the air component commander can order strikes without having to coordinate with the land component commander, if necessary. For instance, on this slide, the enemy tank beyond the FSCL can be a target for interdiction, as you can see.

[BUILD]

Interdiction typically involves attacks on enemy forces, command and control systems, personnel, material, logistics, and their supporting systems (such as ammo storage facilities or bridges), in order to weaken or disrupt the enemy's efforts. In fact, information warfare can be a part of interdiction by intercepting or disrupting the flow of information to the front.

[SLIDE]



{Instructor Note: This slide contains sound effects with the "build" animation.}

Close Air Support (CAS) involves air operations against enemy targets in **close proximity** to friendly forces. That is, CAS **usually** occurs between the FLOT and the FSCL. At times, CAS may be essential to the very survival of our ground forces--hence, CAS is often, by nature, defensive.

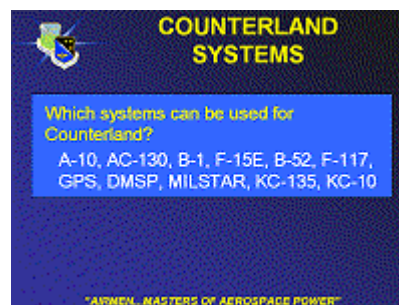
CAS provides direct support to help friendly surface forces carry out their assigned tasks, and since it occurs on the near side of the FSCL, CAS **must** be carefully orchestrated in detail with ground forces. Since CAS can be used to eliminate direct threats to friendly forces, AFDD 1 says CAS produces the most focused but briefest effects of any counterland mission. That is, CAS, by itself, rarely achieves campaign-level objectives, but CAS assures the survival of our ground forces, so they can continue the fight.

You'll remember from Lesson A1210, Air and Space Systems and Capabilities, that the A-10, affectionately known as the "Warthog" (or the "Hog"), is especially suited to perform this function, as you can see on this slide.

[BUILD]

Some functions of CAS may include halting enemy ground attacks, creating gaps for friendly ground forces to penetrate through, covering retreating friendly forces, or even protecting friendly forces as they perform a flanking maneuver around enemies. The key is, friendly and enemy forces are in close proximity.

[SLIDE]



FUQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM COUNTERLAND?

AR:

- [BUILD] Strike aircraft: A-10, AC-130, F-16, F-15, B-1, B-52, F-117, etc.
- For mission support: GPS, DSCS, MILSTAR, KC-10, KC-135, etc.

{Instructor Note: In the future, “space force application” may become a viable element of counterland. AFDD 2-2 says, space force application would consist of attacks against terrestrial-based targets carried out by military weapon systems operating in space. Currently, none exist, and legal restrictions might limit the effectiveness of space-based weapons. But someday, technology and national policy could evolve to make space force application a reality.}

[INTRODUCTORY SLIDE] The next function we will look at is strategic attack. You should realize that although strategic attack focuses on ground targets (as does counterland), it is a separate function of air and space power. We’ll talk about the differences between them.

[SLIDE]



Strategic attack involves operations intended to directly achieve strategic effects by striking at the enemy’s Centers of Gravity, or “COGs.” COGs are those vital factors that, if disabled, could produce the most decisive effects in defeating the enemy. AFDD 1 says strategic attack should produce effects well beyond the proportion of effort we expend. By striking COGS, strategic attack operations are designed to achieve desired objectives without having to defeat the adversary’s fielded military forces, first. This is key:

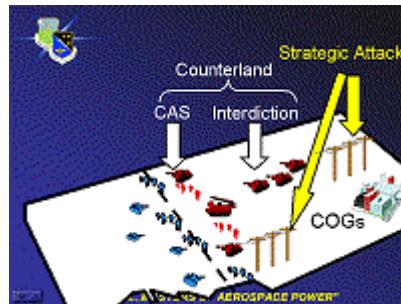
[BUILD] Remember that strategic attack is a function of the **effects** achieved, **not** the forces employed. Consider the examples on this slide: You can imagine how destroying power plants or lines of communication can achieve strategic effects. But what about the bridge? We said earlier that bridges can be targets for interdiction. But a bridge--even one far away from any fielded forces--may become a target for strategic attack because of its importance to the enemy. For instance, a bridge can carry communication lines, such as fiber optic cables.

As you can see, key targets for strategic attack include not only infrastructure like power plants, but also the enemy’s information systems and command and control

system, or “C2.” Striking an enemy’s C2 hub often produces a domino effect called “strategic paralysis,” because disabling C2 centers can cut off the enemy’s leadership from its fielded forces.

Air and space systems are adept at performing strategic attack because they can travel deep into enemy territory and hit the enemy where it hurts, without confronting its fielded forces, first.

[SLIDE]



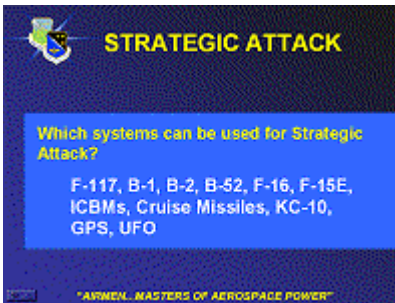
This slide illustrates the differences between strategic attack and counterland:

Close Air Support (CAS) focuses on targets that are confronting friendly forces. CAS has an immediate effect on the battle at hand--but the effects may be short-lived: The benefits are significant, but may be limited to saving a few friendly forces by destroying a few enemy forces.

Interdiction focuses on targets before they can be used against friendly forces. Targets may include airfields, ammunition storage facilities, bridges, or anything used to enhance the enemy’s warfighting capabilities. Again, the benefits are significant, but may be limited to securing the outcome of a single battle.

Strategic Attack focuses on Centers of Gravity. Targets may include C2 facilities, power plants, or even targets intended to demoralize enemy troops and/or population. Targets can be anywhere--either near enemy troops, or far into enemy territory. For instance, as the slide shows, if C2 lines are the COG we choose to strike, their location doesn’t matter. The goal is to affect the enemy’s entire effort, rather than just a single action, battle, or campaign. Also, the effects should produce effects well beyond the proportion of effort we expend.

[SLIDE]



FUQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM STRATEGIC ATTACK?

AR:

- **[BUILD]** F-117, B-1, B-2, B-52, F-16, F-15E, ICBMs, Cruise Missiles, etc.

[INTRODUCTORY SLIDE] As you probably remember from geography class, over 70% of the earth's surface is covered by water. With this in mind, let's see how the Air Force supports sea operations.

[SLIDE]

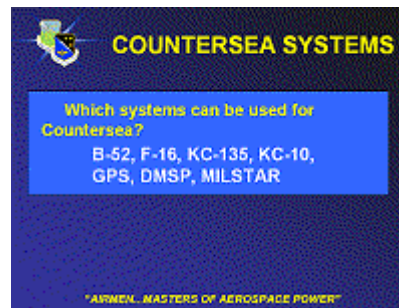


Countersea extends the Airman's perspective into the maritime environment using Air Force resources for independent operations or those in support of naval forces. As with counterair, counterspace, and counterland, the goal is to gain and maintain control of the medium--in this case, the sea.

Some examples of countersea missions include:

- Sea surveillance
- Anti-ship warfare , using Harpoon missiles
- Protect sea lines of communication
- Aerial minelaying
- Air refueling to support naval air operations

[SLIDE]



FUQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM COUNTERSEA?

AR:

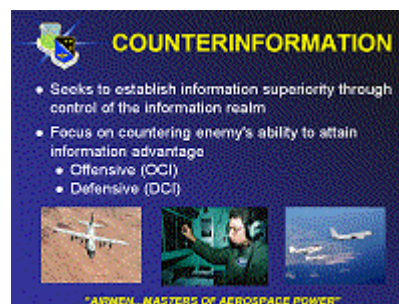
- **[BUILD]** B-52 (to launch Harpoons), F-16, KC-135, KC-10, GPS, DMSP, MILSTAR, UFO, etc.

(TRANSITION): SO FAR, WE'VE DISCUSSED FUNCTIONS (INCLUDING STRATEGIC ATTACK) THAT ALLOW US TO GAIN SEA, LAND, AIR, AND SPACE SUPERIORITY. THESE FUNCTIONS HAVE BOTH OFFENSIVE AND DEFENSIVE ELEMENTS. GAINING CONTROL OF THE SEA, LAND, AIR, AND SPACE MEDIUMS IS CRITICAL TO ACHIEVING MISSION SUCCESS. SO, THE AIR FORCE PERFORMS SEVERAL OTHER FUNCTIONS WHICH ENHANCE OUR ABILITY TO PERFORM THE ONES WE'VE ALREADY DISCUSSED. LET'S DISCUSS THESE, TOO.

- c. **MP II: Counterinformation, Command and Control, Airlift, Air Refueling, Spacelift: 0:20 (1:05)**

[INTRODUCTORY SLIDE] Let's begin with Counterinformation.

[SLIDE]

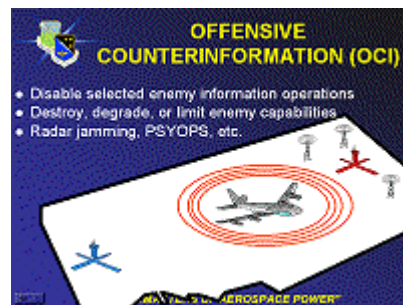


Since military operations hinge on timely and accurate information, we must understand and respect the impact information superiority has on modern warfare.

As with the mediums of air, land, sea, and space, we must control the medium of information. Counterinformation seeks to establish information superiority through control of the information realm. This control allows friendly forces to conduct information operations while minimizing their own losses, and while simultaneously denying the enemy the ability to conduct information operations. So, the focus of counterinformation is to counter the enemy's ability to attain information advantage.

Like counterspace and counterair, etc., counterinformation consists of both offensive and defensive elements.

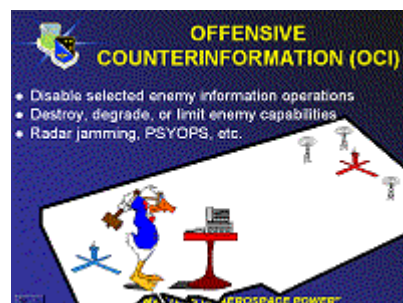
[SLIDE]



Offensive counterinformation (OCI) includes actions to control the information environment, in order to disable selected enemy information operations. OCI operations are designed to destroy, degrade, or limit enemy information capabilities, and depend on our ability to understand the enemy's capabilities.

[BUILD] OCI includes radar jamming, deception, and psychological operations, or "PSYOPS." We might leave the enemy's computer systems operational--but instead, corrupt their data. The enemy might not even know the data is corrupt!

[BUILD]



We have also developed certain cyberattack capabilities, too!

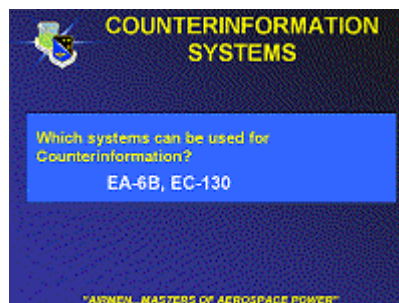
[SLIDE]



Defensive counterinformation (DCI) includes actions to protect our information systems and information operations from the adversary.

[BUILD] The goal is to put a barrier between our information and the enemy. We do that through DCI programs such as Computer Security (COMPUSEC), Operations Security (OPSEC), Information Security (INFOSEC), and counterintelligence. These DCI programs assess the threat and reduce friendly vulnerabilities to an acceptable level.

[SLIDE]



FUQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM COUNTERINFORMATION?

AR:

- [BUILD] EC-130E Commando Solo (for PSYOPS), EA-6B (to support vulnerable systems like the EC-130E)
- Cyberattack (attack from the internet)--possibly communicated through satellites

[INTRODUCTORY SLIDE] When we discussed strategic attack, we said that disrupting enemy command and control centers can cause a domino effect called “strategic paralysis.” This brings us to our next function: command and control.

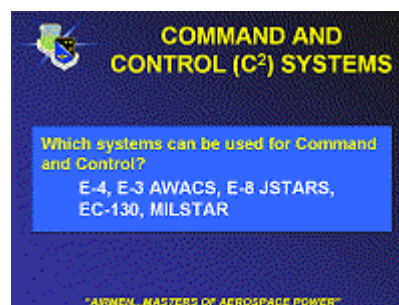
[SLIDE]



Command and control, or C2, is the both the process by which a commander decides what action to take and the system which monitors the implementation of the decision. C2 includes all battlespace management processes for planning, directing, coordinating, and controlling operations. In essence, C2 integrates personnel, systems, and information under one commander.

Aircraft serving the command and control function must be able to remain airborne for many hours on a given mission and be able to communicate with other units in the air, on the surface, or below the surface (i.e., submarines). This is a picture of the E-4 National Airborne Operations Center, or “NAOC,” a national-level C2 system.

[SLIDE]



LOQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM COMMAND AND CONTROL?

AR:

- **[BUILD]** E-4 National Airborne Operations Center, as we just said

- E-3 AWACS, E-8 JSTARS, and EC-130E Airborne Battlefield Command and Control Center (ABCCC) can also remain airborne for many hours and are able to communicate with many other units
- Satellites (MILSTAR, DSCS, etc.) are vital to C2 communication flow, too

[INTRODUCTORY SLIDE] The next two functions we'll discuss are also essential to conducting military operations. Airlift and air refueling are indispensable in getting military forces where they need to be to accomplish their missions. Let's talk about airlift first.

[SLIDE]



Airlift is the transportation of personnel and material through the air, and can be applied across the entire range of military operations in support of national objectives. According to AFDD 1, airlift is a foundation of US national security at the strategic level and a crucial capability for operational commanders within a theater. Airlift is critical to the support of national policies and objectives because it provides “global reach” for US military forces and the capability to quickly apply “global power” to crisis situations worldwide.

Airlift can be classified in three ways:

- **Inter**theater (or strategic) provides the “air bridge” between the US and other theaters--or, from one base in the US to another
- **Intra**theater (or theater) provides the air movement of personnel and material within a CINC’s area of responsibility
- “Operational support airlift” is usually available only for the requirements of the organization to which they are assigned. Usually, this involves transport of limited numbers of personnel and small parcels. For instance, helicopters are operational support aircraft used by Special Forces

[SLIDE]



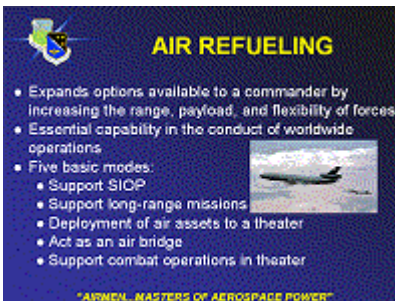
LOQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM AIRLIFT?

AR:

- **[BUILD]** C-17 Globemaster, C-130 Hercules, C-141 Starlifter, C-5 Galaxy, and the CRAF (Civil Reserve Air Fleet)
- GPS and MILSTAR etc. offer support to airlift

[INTRODUCTORY SLIDE] Now, let's talk about air refueling.

[SLIDE]



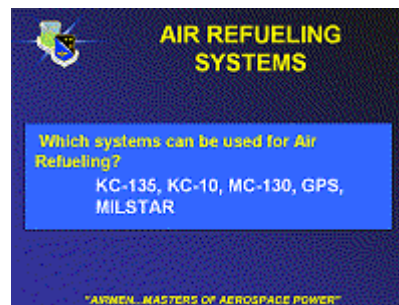
Air refueling expands the employment options to a commander by increasing the payload, range, and flexibility of forces. Air refueling enables worldwide operations, and is especially important when overseas basing is limited or not available.

The Air Force employs air refueling assets in five basic modes of operation:

- Support of the nuclear Single Integrated Operation Plan (SIOP)--such as tankers that could be tasked to “stand alert” along with nuclear bombers
- Support of long-range conventional strategic attack missions--such as a KC-10 refueling a B-2 on a strategic attack mission to Serbia
- Deployment of air assets to a theater--such as a KC-135 refueling a squadron of F-16s deploying from the US to Italy

- Support of an “airlift line of communication,” or “air bridge,” which is a continuous flow of airlift--such as tankers refueling C-141s carrying supplies to Somalia
- Support of combat aircraft operating within a theater--such as tankers refueling F-15s and/or AWACS on a given mission

[SLIDE]



LOQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM AIR REFUELING?

AR:

- [BUILD] KC-135 Stratotanker, KC-10A Extender--of course!
- MC-130P Combat Shadow and HC-130 can refuel helicopters
- GPS, MILSTAR offer operational support, communications, etc.

[INTRODUCTORY SLIDE] Just as airlift and air refueling support the movement of assets through the medium of air, the next function we'll cover--spacelift--provides movement of assets into or through the medium of space.

[SLIDE]



Spacelift projects power by delivering satellites, payloads, and material into or through space. The objective of spacelift is to launch new systems or replenish existing space assets as necessary to support our national security objectives.

There are three types of spacelift:

- “Launch to Deploy” includes launches to achieve initial operational capability of a new satellite system. These launches occur on a predetermined schedule. For instance, when the planned Space-Based Infrared System (SBIRS) replaces the Defense Support Program (DSP), “launches to deploy” will put the SBIRS “constellation” of satellites into orbit
- “Launch to Sustain” includes launches to replace satellites that are predicted to fail--or those that fail abruptly. Since satellites contain a limited amount of thruster fuel for orbital corrections, they can’t stay operational indefinitely. For instance, we use “launches to sustain” to replace systems in the GPS constellation on a regular basis
- “Launch to Augment” includes launches to increase operational capability in response to contingency requirements, crisis, or war. For instance, if a crisis broke out tomorrow, we might “launch to augment” a constellation of National Systems (“spy satellites”) to increase our coverage of the crisis area

[SLIDE]



LOQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM SPACELIFT?

AR:

- [BUILD] Atlas, Delta, Pegasus, Titan II, and Titan IV launch systems
- AFSCN--The Air Force Satellite Control Network--maneuvers, supports, and sustains forces in orbit

(TRANSITION): WE OFTEN CONDUCT COUNTERINFORMATION, COMMAND AND CONTROL, AIRLIFT, AIR REFUELING, AND SPACELIFT OPERATIONS IN FRIENDLY TERRITORY. BUT WHEN THE SITUATION CALLS FOR IT, WE CAN SEND HIGHLY SKILLED, WELL-TRAINED

FORCES INTO POTENTIALLY HOSTILE TERRITORY, TOO. AND WHEN WE DO, WE WANT THESE FORCES TO KNOW EXACTLY WHERE THEY ARE, WHERE THEY'RE GOING, AND EXACTLY WHAT CONDITIONS THEY'LL FACE. SO, LET'S TALK ABOUT THE FUNCTIONS THAT MAKE THIS POSSIBLE.

d. MP III: Special Operations Employment, Reconnaissance, Surveillance, Intelligence, Combat Search and Rescue, Navigation and Positioning, and Weather Services: 0:20 (1:25)

[INTRODUCTORY SLIDE] Let's begin with Special Operations Employment.

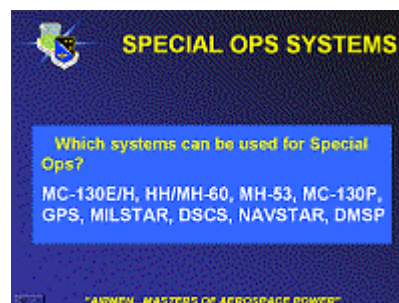
[SLIDE]



Special operations employment uses aerospace power to provide surgical firepower, special tactics, and mobility in “denied territory.” Special operations forces (SOF) are normally organized and employed in small formations capable of independent or supporting operations. SOF provides timely, tailored responses across the range of military operations, including unconventional warfare, special reconnaissance, counter-terrorism, foreign internal defense, psychological operations, and counterproliferation.

SOF provides commanders options to defuse situations with low-visibility actions, often in enemy-controlled or politically sensitive areas.

[SLIDE]



LOQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM SPECIAL OPERATIONS EMPLOYMENT?

AR:

- [BUILD] MC-130E/H Combat Talon, MC-130P Combat Shadow (for helicopter refueling), MH-60 Pave Hawk, MH-53 Pave Low, etc.
- GPS, MILSTAR, DSCS, NAVSTAR, DMSP, etc.

[INTRODUCTORY SLIDE] The next three functions we'll discuss form an "information triad" known as Intelligence, Surveillance, and Reconnaissance, or "ISR." The three functions of this "triad"--Intelligence, Surveillance, and Reconnaissance--work hand-in-hand to provide the information necessary for the entire range of military operations, as well as for national security processes beyond the military, too. I'll address them in reverse order--you'll see why in a minute. So, let's begin with Reconnaissance.

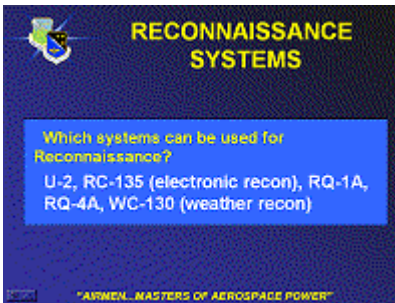
[SLIDE]



Reconnaissance is obtaining, by visual observation or other detection methods, specific information about the activities and resources of an enemy or potential enemy. Reconnaissance also includes securing data on the meteorological, hydrographic, or geographic characteristics of a particular area. Reconnaissance taskings generally have a **time constraint**, and are focused on observing a **particular target**.

Reconnaissance systems are tailored to provide the flexibility, responsiveness, versatility, and mobility required by the strenuous demands of fluid, global taskings. Reconnaissance forces and systems possess multiple and diverse capabilities, including visual, infrared, and radar imaging systems.

[SLIDE]



LOQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM RECONNAISSANCE?

AR:

- **[BUILD]** U-2 Dragon Lady, RC-135 (for electronic reconnaissance), unmanned aerial vehicles such as the RQ-1A Predator and the RQ-4A Global Hawk, WC-130 (for weather reconnaissance), National Systems (“spy satellites”), etc.

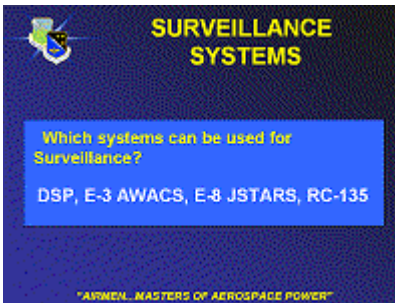
[INTRODUCTORY SLIDE] Next, let’s talk about Surveillance, which is closely related to Reconnaissance as part of the “ISR triad.”

[SLIDE]



Surveillance is systematically observing air, space, surface, or subsurface areas by visual, electronic, photographic, other means. Surveillance differs from reconnaissance in two basic ways: Surveillance is a **continuing process** and is **not oriented to a specific target**. Air- and space-based surveillance assets exploit elevation to detect enemy initiatives at long range. Since this is so, surveillance systems are the eyes and ears of our combat forces, and provide indispensable warning of potential threats.

[SLIDE]



LOQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM SURVEILLANCE?

AR:

- **[BUILD]** DSP satellites maintain constant surveillance of the entire earth for early warning of missile launches, and both DSP and GPS can detect nuclear detonations
- U-2 Dragon Lady, E-3 AWACS, E-8 JSTARS, EC-130E ABCCC, EC-130H Compass Call, and RC-135 can maintain surveillance in a theater of military operations
- Unmanned aerial vehicles such as the RQ-1A Predator and the RQ-4A Global Hawk are suited for surveillance, due to long loiter capabilities

[INTRODUCTORY SLIDE] Next, let's complete the "ISR triad" by talking about Intelligence.

[SLIDE]



Intelligence provides clear, brief, relevant, and timely analysis on foreign capabilities and intentions for planning and conducting military operations.

Intelligence is useful, refined information, stemming from data gathered from all sources--**including** (but not limited to) data gathered **by reconnaissance and surveillance** systems.

Intelligence provides commanders and combat forces the details necessary to “know the enemy” and operate smarter. It helps commanders make better decisions. So, you can see why I addressed the “ISR triad” in reverse order:

[SLIDE]



Reconnaissance and surveillance systems collect data, . . .

[BUILD] . . . and intelligence personnel and organizations turn that data into useful information for commander.

LOQ: WHAT IS THE DIFFERENCE BETWEEN DATA AND INTELLIGENCE?

AR:

- Data is the raw information you could obtain from surveillance, reconnaissance, **and many other sources**--including the open press, etc.
- Intelligence is the product of refining that information through analysis--for instance, by drawing conclusions from the raw data

Keep this in mind: Intelligence often depends on surveillance and reconnaissance for data, but the products of surveillance and reconnaissance aren't always very useful to commanders until they're assessed and turned into intelligence.

Here's an example: A reconnaissance satellite yields images of unusual formations of enemy troops: That's just a few data points. Surveillance adds information on the movement of these enemy troops throughout the theater: Again, that's just more data. The task of intelligence is to draw conclusions from this surveillance and reconnaissance data, **plus** data from other sources. The result of the intelligence effort could be, "The enemy is planning an attack." But it could also be, "This is just an exercise." That's the task of intelligence, and by extension, the role of the "ISR triad."

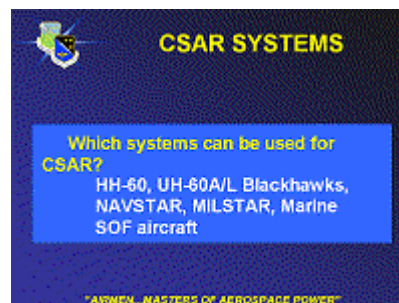
[INTRODUCTORY SLIDE] Even the most sophisticated equipment is useless without qualified personnel to operate it. Never forget that the most important assets possessed by the Air Force are neither air nor space systems, but rather personnel--including you! The Air force needs to protect its personnel in every situation--including war. So, to rescue downed airmen, the Air Force performs the vital function of combat search and rescue, or “CSAR.”

[SLIDE]



Combat Search and Rescue (CSAR) consists of those air operations conducted to recover distressed personnel during wartime or Military Operations Other Than War (MOOTW). It is a key element in sustaining morale, cohesion and fighting capability of friendly forces.

[SLIDE]



LOQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM COMBAT SEARCH AND RESCUE?

AR:

- **[BUILD]** MH-60 Pave Hawk, MH-53 Pave Low, Army UH-60 Black Hawk, Navy/Marine helicopters, etc.
- HC-130 (for helicopter refueling)
- Other SOF aircraft, when SOF supports CSAR missions
- GPS, MILSTAR, DSCS, NAVSTAR, DMSP, etc.

[INTRODUCTORY SLIDE] Next, let's talk about Navigation and Positioning, so these CSAR troops can find their way around.

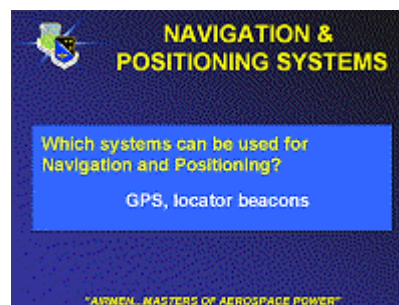
[SLIDE]



Navigation and positioning provides accurate location and time of reference data in support of strategic, operational, and tactical operations. Navigation and positioning helps air forces get where they need to be for air refueling rendezvous, synchronization of effort in strike packages, accurate weapons delivery, and search and rescue operations. Our continuing development of navigation and positioning systems and capabilities enhances our selection of targets, routes, weapon systems, and delivery tactics.

For example, the Global Positioning System (GPS) constellation of 24 satellites can pinpoint the position, altitude, and velocity of any GPS receiver with great precision--and keep track of the time, too. On the right, you see a GPS satellite. On the left, there's a B-2 delivering a GPS-guided Joint Direct Attack Munition, or "JDAM."

[SLIDE]



LOQ: WHICH AIR AND SPACE POWER SYSTEMS--AND SUB-SYSTEMS--COULD BE USED TO PERFORM NAVIGATION AND POSITIONING?

AR:

- **[BUILD]** Global Positioning System (GPS), of course!
- Other navigation and positioning sub-systems include air-to-surface radars (such as radar altimeters and the B-1 Lancer's automatic terrain-following radar system)
- Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) (for flying an F-15 or F-16 at low altitudes and attacking surface targets at night and in bad weather)
- F-117's automated mission planning system and autopilot (which can be programmed to avoid known threats on the way to the target), etc.

[INTRODUCTORY SLIDE] Finally, let's talk about Weather Services.

[SLIDE]



Weather services supplies timely and accurate environmental information regarding both atmospheric weather and the space environment. The Air Force performs weather services for the entire Department of Defense. With accurate weather information, military commanders are able to plan, execute, and make modifications to operations as necessary to achieve their objectives. Weather services also influence the selection of targets, routes, weapon systems, and delivery tactics.

In addition to satellites, certain aircraft are specialized for gathering weather information, such as the WC-130. The WC-130's specialty is severe weather monitoring--that is, "hurricane hunting!"

Let's take a look at a short video of a WC-130 "Hurricane Hunter" flying inside the eye of a hurricane.

(Instructor Note: The following slide contains sound effects to accompany the animation.)

[SLIDE]



[SLIDE]



LOQ: WHICH AIR AND SPACE POWER SYSTEMS COULD BE USED TO PERFORM WEATHER SERVICES?

AR:

- **[BUILD]** WC-130, of course!
- Defense Meteorological Satellite Program (DMSP) and other satellite systems monitor both atmospheric weather and the space environment, etc.

e. Conclusion: 0:05 (1:30)

1) //Summary//

[SLIDE]



We've talked about the 17 different functions of air and space power--those broad, fundamental, and continuing activities through which the Air Force accomplishes

its assigned missions. Each function makes an important contribution--by combining them together, we can maximize the effectiveness of our weapon systems. Keep an open mind when it comes to assigning missions to particular air and space systems: Above all, you should remember how flexible air and space systems are in performing these functions.

2) //Remotivation//

You'll use the information we covered today throughout the course, and throughout your careers. Everything we do in the Air Force either directly involves or supports these functions, so it's vital to understand what each one is all about.

3) //Closure//

The bottom line of this lesson is, the benefits of aerospace power aren't measured by how many sorties we fly, or by how many bombs we drop, or even by how many targets we hit. Rather, aerospace power's benefits are determined by the effects produced by the entire spectrum of aerospace operations. Remember the air and space systems we've studied--as well as the functions of air and space power they can perform. Start thinking about teaming them together to produce **synergy**: That's what we'll do in Lesson A1230, Force Packaging.